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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/604,044	06/24/2003	Gordon R. Woodcock	19441.0060	1043
29052 7590 08/22/2007 SUTHERLAND ASBILL & BRENNAN LLP 999 PEACHTREE STREET, N.E. ATLANTA, GA 30309			EXAMINER DOVE, TRACY MAE	
			ART UNIT 1745	PAPER NUMBER
			MAIL DATE 08/22/2007	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

Application No.

10/604,044

Applicant(s)

WOODCOCK ET AL.

Examiner

Tracy Dove

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 15 June 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 21-30 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 21-30 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

This Office Action is in response to the communication filed on 6/15/07. Applicant's arguments have been considered, but are not found persuasive. Claims 21-30 are pending. This Action is made FINAL, as necessitated by amendment.

#### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 21-30 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 21 and 30 recite "to provide a molar flow rate of a reactant through said flow field path proportional to the electrochemical surface area serviced", which is indefinite. It is unclear how the molar flow rate of the reactant through the flow field and the electrochemical surface area serviced are related. Specifically, the term "proportional to" is indefinite because it is unclear what the limitation encompasses.

To the extent the claims are understood in view of the 35 USC 112 rejection above, note the following prior art rejections.

#### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

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(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 21-24, 26 and 28-30 are rejected under 35 U.S.C. 102(b) as being anticipated by Cavalca et al., US 5,686,199.

Cavalca teaches a flow field plate for use in a proton exchange membrane fuel cell. The plate includes a network of flow passages (at least two flow field paths) for supplying the fuel or oxidant to the flow field and a network of flow passages for receiving the gases discharging from the flow field. Each flow sector includes a plurality of substantially parallel flow channels formed in the substantially planar plate surface, with each sector partitioned so as to subdivide the channels into a plurality of sets of channels disposed in serial flow relationship. The flow field configuration permits the reactant gases to be transported so as to supply the gases evenly to the entire active area of the corresponding fuel cell electrode (gas flow proportional to the active area serviced) with very low reactant gas pressure drop (abstract). The widths of the flow channels are selected so that the reactant gases flowing through each of the flow channels is permitted to diffuse outward through the porous backings of the corresponding electrodes in a manner which distributes the reactant gases to the entire active area of the anode and cathode of the fuel cell. The width and depth of the channels may be substantially constant along the length of each of the channels (7:1-53). Note the Figures. Thus the claims are anticipated.

\*

Claims 21-28 and 30 are rejected under 35 U.S.C. 102(e) as being anticipated by Boff et al., US 7,067,213.

Boff teaches flow field plate geometries wherein the flow field plate is used for a fuel cell. The plate comprises on at least one face an assembly of channels comprising one or more gas delivery channels and a plurality of gas diffusion channels connecting thereto (abstract). By forming sufficiently fine channels on the face of the flow field plates, the reactant gases are evenly distributed across the electrodes (gas flow proportional to the electrode active area serviced) of the fuel cell (2:64-67). The narrow channels result in reduction in resistive electrical losses in the gas diffusion layer (4:10-14). The channels may be of varying width (4:31-34). The pattern of channels may have different widths and depths. Applying such a pattern of channels of varying width and depth has advantages such as ensuring uniform supply of reactant material to the electrodes and to ensure prompt removal of reacted products (5:6-16). Note the Figures. Thus the claims are anticipated.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 21-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Debe et al., US 6,780,536.

Debe teaches flow fields for uniform distribution of fluids or their active components or properties to and from a target area (2:32-36). The flow field may be embodied in a flow field device such as a flow field plate or bipolar plate used for distribution of reactants to, and removal of products from, opposite sides of a catalyzed membrane in an electrochemical cell such as a

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fuel cell (1:10-15). The flow fields provide more uniform access of the fluid or its active component to the target area by providing highly uniform lateral flux through the fluid transport layer separating the flow field from the target area for the transported fluid (4:54-61). Uniform distribution (proportional to the active area serviced) of the fuel cell reactants (fuel and oxidant) over the catalyst electrodes in a fuel cell should result in more uniform utilization of the catalyst, resulting in better performance, stability and durability. Furthermore, the flow fields result in more uniform distribution of current density and waste heat generation. It is believed that the partial pressures of fuel and oxidant at the surface of the catalyst at any given point in an electrode of a fuel cell are directly related to the speed of the lateral flux of the gas in the DCC (5:50-65). The flow field includes significant land areas and may be composed of a single or multiple channels. The active area of the flow field may be any suitable size and shape and may be subdivided into separate zones serving separate portions of the target area. The flow field channels may have any suitable cross-section (6:32-57). Designs having non-parallel sequential channel segments may include a "zig-zag" serpentine design comprising at least one serpentine channel having non-parallel sequential major segments. The major segments may be curved, but are typically straight line segments. Turning segments may be made up of curved segments or one or more straight segments. Alternately the major segments may meet at a point (8:43-9:63).

Debe does not explicitly teach the at least two flow field paths have lengths different from one another. However, the invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because Debe teaches the active area may be subdivided into separate zones serving separate portions of the target area and treating each portion as a single target area, served by a single channel or a channel composed of multiple

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courses. The active area can be any suitable size and shape (6:45-54). The channels may terminate at one end in a single or multiple opening inlet and at another end in a single or multiple opening outlet (6:55-67). Therefore, Debe at least suggests that the flow field paths may have lengths different from one another. Also, equation 2 of Debe shows the total pressure varied linearly along the flow channel so the pressure drop is proportional to the path length.

***Response to Arguments***

Applicant's arguments filed 6/15/07 have been fully considered but they are not persuasive. Applicant states the present specification teaches a fluid path with bends offers more resistance than a straight fluid flow path of the same total length. However, this concept was not novel at the time of invention by Applicant, but is considered common knowledge. Examiner believes the other asserted inventive concepts are taught by the cited prior art.

Applicant argues Cavalca fails to disclose a flow field plate that has at least two flow field paths having different lengths from one another which are dimensioned to provide a molar flow rate of a reactant proportional to the electrochemical area serviced by the flow field path. Note this limitation has been rejected as indefinite. Furthermore, Applicant asserts Cavalca teaches symmetric flow sectors having the same average path lengths. However, the claimed invention does not require channels of different lengths, but requires flow paths of different lengths. The terms "channel" and "flow path" are not synonymous.

Applicant argues Boff fails to disclose a flow field plate that has at least two flow field paths having different lengths from one another which are dimensioned to provide a molar flow rate of a reactant proportional to the electrochemical area serviced by the flow field path. Note this limitation has been rejected as indefinite. However, Boff teaches flow field plate geometries

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wherein the flow field plate is used for a fuel cell. The plate comprises on at least one face an assembly of channels comprising one or more gas delivery channels and a plurality of gas diffusion channels connecting thereto (abstract). By forming sufficiently fine channels on the face of the flow field plates, the reactant gases are evenly distributed across the electrodes (gas flow proportional to the electrode active area serviced) of the fuel cell (2:64-67). The narrow channels result in reduction in resistive electrical losses in the gas diffusion layer (4:10-14). The channels may be of varying width (4:31-34). The pattern of channels may have different widths and depths. Applying such a pattern of channels of varying width and depth has advantages such as ensuring uniform supply of reactant material to the electrodes and to ensure prompt removal of reacted products (5:6-16). Note the Figures. Examiner again points out the claimed invention does not require channels of different lengths, but requires flow paths of different lengths. The terms "channel" and "flow path" are not synonymous.

Regarding Debe, Applicant refers to the flow channels. However, the claimed invention does not require channels of different lengths, but requires flow paths of different lengths. The terms "channel" and "flow path" are not synonymous. Applicant argues Debe does not provide any motivation to modify the lengths. However, equation 2 of Debe shows the total pressure varied linearly along the flow channel so the pressure drop is proportional to the path length.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).



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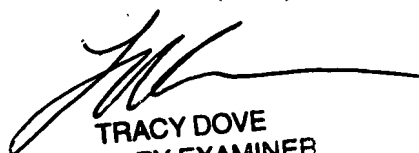
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tracy Dove whose telephone number is 571-272-1285. The examiner can normally be reached on Monday-Thursday (9:00-7:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

August 20, 2007

  
TRACY DOVE  
PRIMARY EXAMINER